PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Tarabulski, et al.	)	Examiner: D. Tran
	)	
Serial No.: 10/718,839	)	Art Unit: 3748
	)	
Filed: November 20, 2003	)	
	)	

For: MOBILE DIESEL SELECTIVE CATALYTIC REDUCTION SYSTEMS AND METHODS

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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3/31/05

Signature: Carol Prentice
Carol Prentice

DECLARATION UNDER 37 C.F.R. § 1.132

I, Rod Radovanovic, declare that:

1. I currently work as a consultant in the field of diesel engine components, working for companies that test, develop, and/or manufacture various components for diesel engines, in particular, after-treatment devices for reducing exhaust emissions. I am a retired Director of Cummins, Inc., with over 36 years of experience in the field. I am listed as an inventor on five issued patents and five pending patent applications pertaining to diesel engines and exhaust after-treatment.

2. I received a B.S. degree in Automotive Engineering from the University of Belgrade in 1965 and a Ph.D. in Thermo Science from the University of Alabama in 1978.

3. From 1978 until 2004 I worked for Cummins Inc. in the Advanced Engines & Systems (Research department), in Advanced Product Development, and for the last six years in the Advanced Engineering department as a Director. I have lead many projects for emissions reduction for both on highway and off highway engines, including SCR applications for Power Generation equipment. I was/am very familiar with Cummins' development of an SCR application for the Euro IV/V emissions, as well as the development of an SCR system for aftermarket application for on highway vehicles by Fleetguard Emissions Solutions (FES) which is Cummins/Fleetguard division.

4. I have been an SAE member since 1977, a Member of Advanced Power Plant Committee, and a Chairman of the Diesel Engine Committee for 2004-2005. In my work for SAE I have been a co-organizer of the In-Cylinder Diesel NOx and Particulate Control session for many years. In 2001 I received the SAE McFarland award for organizing Power Boost sessions over previous years.

5. I am familiar with the technology described in Combustion Components Associates, Inc.'s (hereinafter "Combustion Components") U.S. patent application no. 10/718,839 and have experience working with the system described therein (hereinafter the "system").

6. In my experience working with the system described in Combustion Component's patent application, I have grown to appreciate its many advantages over existing prior art NOx reduction systems (like FES's system).

7. The system provides significant NOx reduction for machines that are in the possession of owner/operators (i.e., in-use systems), and the system is advantageously suited to retrofit applications, requiring little machine or vehicle downtime to install.

8. The system's temporary use of a NOx sensor during the learn-in phase to develop the injection strategy for the reagent injection overcomes significant cost and reliability

issues inherent with state of the art NOx sensors that are permanently installed on a machine. Demonstrated life of state of the art NOx sensors is only 1000 hours, and such sensors experience significant drift over that short life (i.e., a different signal may be generated at different times for the same quantity of NOx in the exhaust). Such characteristics make the use of such sensors unsuitable as a permanent control for real-time calculation of the amount of reagent to inject. These problems are overcome by Combustion Components' temporary use of the NOx sensor to develop the reagent injection control strategy, which negates the need for costly and unreliable permanent sensors. With the system developed by Combustion Components, one NOx sensor can be used repeatedly to retrofit a large number of vehicles or machines. Further, once an injection strategy is developed for one vehicle in a fleet of vehicles, this injection strategy can be applied directly to other identical vehicles in the fleet without further testing or use of the NOx sensor on those other vehicles.

9. A further advantage of the system is provided by the development of the injection control strategy during normal operation of the machine or vehicle, which significantly reduces the costs associated with retrofitting in-use engines by reducing downtime of the machine or vehicle, since once the temporary NOx sensor is installed, the machine or vehicle can be used in a normal manner while the injection strategy is developed. Downtime associated with dynamometer testing and/or removing the engine from the vehicle, and the cost associated therewith, is eliminated by the system.

10. The system provides Combustion Components with a competitive advantage in the industry, as no other company provides a system having the advantages of the Combustion Components' system.

11. Accordingly, the system overcomes problems associated with reducing NOx emissions in existing in-use engines that have not been solved by others, while also satisfying a long felt need in the industry.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that all statements made herein are made with the knowledge that the making of willfully false statements and the like is punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and may jeopardize the validity of the application and any patent issuing thereon to which this verified statement is directed.

Radovanovic

Rod Radovanovic

Dated: 3/28/2005

ATTORNEY DOCKET NO.: CCA-119

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Tarabulski, et al.	)	Examiner: D. Tran
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For: **MOBILE DIESEL SELECTIVE CATALYTIC REDUCTION SYSTEMS AND METHODS**

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DECLARATION UNDER 37 C.F.R. § 1.132

I, Theodore J. Tarabulski, declare that:

1. I am one of the Applicants in the above-identified U.S. patent application (referred to herein as "the present application"), and one of the inventors of the invention disclosed and claimed therein.

2. The present application claims priority from U.S. provisional patent application no. 60/428,326 filed on November 22, 2002.

3. I am, and at the time of conception of the present invention was, employed by Combustion Components Associates, Inc. (hereinafter "Combustion Components"), the assignee of the present application, as an Engineer. I have been employed by Combustion

Components for 2 years, and have more than 21 years of experience in the field of exhaust emission control and reduction systems. I received a B. S. degree in Mechanical Engineering and a Masters of Science degree from Pennsylvania State University. I am listed as an inventor on several patents in the field or exhaust emission control and reduction, including: U.S. patent no. 5,809,774; U.S. patent no. 5,809,775; U.S. patent no. 5,924,280; U.S. patent no. 5,968,464; U.S. patent no. 5,976,475; U.S. patent no. 6,203,770; and U.S. patent no. 6,279,603.

4. The invention claimed in the present application satisfies a long felt need in the industry for methods and apparatus for retro-fitting existing and in-use lean burn engines with NOx reduction systems. The present invention is applicable to all types of in-use engines, including engines in existing vehicles, as well as engines used in construction equipment, generators, off-road vehicles, and the like.

5. Due to existing and impending government NOx emissions standards, it became apparent that there existed a need in the art to enable existing in-use engines to comply with the increasingly stringent government NOx emission requirements, and to retrofit such engines in existing vehicles without the need for extensive downtime, engine removal from the vehicle, dynamometer testing, or visits to testing facilities.

6. There are various NOx reduction techniques provided in the prior art. However, there is no prior art system that I am aware of that can be used to easily and (relatively) inexpensively retrofit a vehicle with a NOx reduction system that provides an SCR system that uses a reagent injection strategy specifically tailored to the particular vehicle (or vehicle type) without removal of the engine or extensive vehicle downtime.

7. Accordingly, there was a long felt need in the art for methods and systems for retrofitting existing vehicles (and other in-use engines) with an SCR reduction system having an injection strategy specifically tailored therefor.

8. As a result of this long felt need, Combustion Components began developing a system that could be used to reduce NOx emissions on existing, in-use, lean burn engines. I, together with co-inventor Jeffrey Brooks, worked on this project for Combustion Components. Our work on this project resulted in the present invention. The present invention solves this long felt need in the industry by temporarily installing a NOx sensor on a vehicle, and then developing an injection strategy for injection of a reagent into the vehicle exhaust based on detected NOx emissions at various engine operating conditions generated during normal operation of the vehicle. Once the injection strategy is developed, the NOx sensor can be removed and the injection of the reagent can be controlled using the injection strategy.

9. The temporary use of the NOx sensor to develop the injection strategy overcomes cost and reliability issues associated with permanently installing a NOx sensor on each vehicle. The demonstrated life cycle of available NOx sensors is approximately 1000 hours. A typical NOx sensor for such an application costs approximately $400. Accordingly, installing a NOx reduction system on a vehicle that employs a permanently installed NOx sensor that requires replacement every 1000 hours will become prohibitively expensive, especially for the owner of a truck fleet where such a system would be required on each truck in the fleet. Further, as existing NOx sensors are known to experience significant drift over their 1000 hour life span, systems using permanently installed NOx sensors become unreliable over time. With the present invention, a single NOx sensor can be installed temporarily and used to develop the injection strategy on a vehicle, and then removed for use on another vehicle. Further, once an injection strategy is developed for a particular vehicle in a fleet, the same injection strategy can be used on other identical vehicles in the fleet that are used in substantially the same manner. Accordingly, the present invention provides significant savings to vehicle owners by reducing system costs (since the purchase of a NOx sensor for permanent installation is not required, only one NOx sensor is needed to retrofit an entire fleet of vehicles, and repair/replacement of permanently installed NOx sensors is obviated).

10. Further, by establishing the injection strategy during normal operation of the vehicle, there is little vehicle downtime associated with the present invention. Once the system is installed, the vehicle can be used in a normal manner and for its normal purpose (e.g., making deliveries) until enough time has elapsed for the injection strategy to be developed such that the sensor can be removed. With the present invention, there is no need for the engine to be removed from a vehicle and placed on a dynamometer; rather, the vehicle can be used in a normal manner while the injection strategy is developed.

11. In addition, by developing the injection strategy during normal vehicle operation, the present invention accounts for variables associated with real-world use of the engine in the vehicle or other equipment. Accordingly, the present invention provides more efficient NOx reduction than can be achieved using an injection strategy developed using an esoteric test cycle on a dynamometer, that may or may not be relevant to the actual operation of the vehicle.

12. As indicated in the present application, initial testing of the present invention was successful and produced an average reduction in NOx emissions of greater than 70% when applied to a 2000 GMC medium duty truck (see, Applicants' Figure 4, and specification, page 15, lines 4-11).

13. Accordingly, the claimed invention overcomes problems associated with reducing NOx emissions in existing in-use engines that have not been solved by others, while also satisfying a long felt need in the industry.

14. In addition, the claimed invention has received a warm welcome and has been appreciated in the field.

15. Since introducing the present invention into the market in 2004 the present invention has met with commercial success. To date, the system of the present invention has been successfully installed on several large construction vehicles, including eight Caterpillar

657E Scrapers, a Caterpillar 637 rubber-tired bulldozer, a Caterpillar 834 Water Pull, a Volvo L220E rubber-tired loader, and a 2001 freightliner over the road tractor with a Caterpillar C-12 425 Hp engine. These installations of the present invention have generated substantial revenue for Combustion Components.

16. The present invention is marketed by Combustion Components under the name ELIM-NOx™. A copy of Combustion Components marketing brochure for the ELIM-NOx system is attached as **Exhibit A**. As indicated in the attached brochure, the present invention achieves a substantial NOx reduction in diesel exhaust NOx emissions. In particular, the present invention can drive NOx emissions in existing in-use diesel engines to levels which are 70% below the impending 2007 government standards. Note that the cover of the brochure illustrates a system in accordance with the present invention installed on a vehicle after development of the injection strategy and removal of the NOx sensor. The last page of the brochure illustrates the system as initially installed on a vehicle with a temporary NOx sensor and temporary exhaust flow and temperature sensors installed.

17. The present invention has been the subject of numerous Press Releases in various online publications, including but not limited to Today's Trucking (todaystrucking.com), MSNBC (msnbc.msn.com), EIN publishing (eintoday.com), Grading and Excavation Contractor Magazine (forester.net), DieselNet (dieselnet.com), Wall Street News Alert (wallstreetnewsalert.com), TruckingInfo (truckinginfo.com), and ArriveNet (arrivenet.com), copies of which are attached hereto as Exhibit B.

18. An article describing the invention authored by myself and Ravi Krishnan entitled "The Economics of Emissions For Heavy-Duty Trucks" was published in the November 2004 North American Edition of Diesel Progress. This article describes the strict emissions requirements imposed by the EPA and the prior art options available to manufacturers and fleet owners to meet such strict emissions requirements, including retiring older engines, converting engines to alternate fuels (such as natural gas) and

retrofitting older engines with modern emission control technology, such as Exhaust Gas Recirculation, commonly referred to as EGR, and the estimated costs associated with compliance with these regulations. The article goes on to explain the use of an SCR catalyst in connection with a reducing agent such as aqueous urea to reduce NOx emissions on stationary sources, and indicates that the present invention solves many of the problems of applying SCR reduction technology to mobile engines, such as vehicle engines.

19. Combustion Components has received a New Technology Research and Development Grant from the Texas Commission on Environmental Quality to obtain EPA verification of the present invention for use in Texas.

21. Customers of Combustion Components have commented on the novelty of the present invention and its ability to address the long felt need in the art for a long-life reliable NOx sensor. As discussed above, the present invention solves the problems associated with the short life span and temperature drift associated with existing NOx sensors by providing a NOx reduction system that is not dependent on a permanently installed NOx sensor.

22. In sum, the present invention has satisfied a long felt need in the industry by overcoming various problems in the prior art that have not been solved by others. In doing so, the present invention has been warmly received in the industry. Further, the present invention has proved to be a commercial success.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that all statements made herein are made with the knowledge that the making of willfully false statements and the like is punishable by fine or imprisonment, or both, under

Section 1001 of Title 18 of the United States Code, and may jeopardize the validity of the application and any patent issuing thereon to which this verified statement is directed.

Theodore J. Tarabulski

Dated: 3/30/05

ATTORNEY DOCKET NO.: CCA-119

EXHIBIT A

ELIM-NOx™ IS COST EFFECTIVE

The amount of reagent consumed will increase with the amount of NOx reduction required and the amount of NOx emitted by the truck. CCA has developed a proprietary technology to evaluate the applicability of ELIM-NOx™ and provide a map of the injection criteria without extensive vehicle downtime or dynamometer tests.

The cost of operation is shown in the table below for a typical over the road truck.

Engine Model Year	2002	1998	1991	1988	Units
NOx Emissions Rating	2.5	4	5	8	g/bhp-hr
NOx Reduction	70%	70%	70%	70%	%
Annual Miles	125,000	125,000	125,000	125,000	miles
Average Speed	50	50	50	50	mph
Engine Load Factor	70	70	70	70	load factor
Rated Horsepower	350	350	350	350	hp
NOx Eliminated	1.2	1.9	2.4	3.8	tons/year/truck
32 wt% Urea Consumption	546	874	1,093	1,749	gallons/year
Cost Effectiveness	$4,200	$2,800	$2,300	$1,700	$/ton

REASONS TO INSTALL ELIM-NOx™ ARE:

- Cost of retrofit can be paid for by federal and/or state programs
- Ease the permitting process for expansion
- Mitigate environmental penalties
- Allow continued use of older trucks
- Future programs may provide financial incentives ($/ton)
- More cost effective than CNG engines
- Alternative to EGR equipped engines with fuel economy penalty

For NOx control, the only significant NOx reduction option fleet owners have is natural gas engines. CCA's ELIM-NOx™ system will change that. There are numerous state or local government incentives being created to encourage equipment owners to apply retrofit technology. CCA can retrofit equipment with an ELIM-NOx™ system without extensive downtime, engine removal, dynamometer tests, or road trips to test facilities. If you think this technology in combination with your equipment could reduce significant tons of NOx, contact CCA and ask for a mobile SCR application specialist for more information.

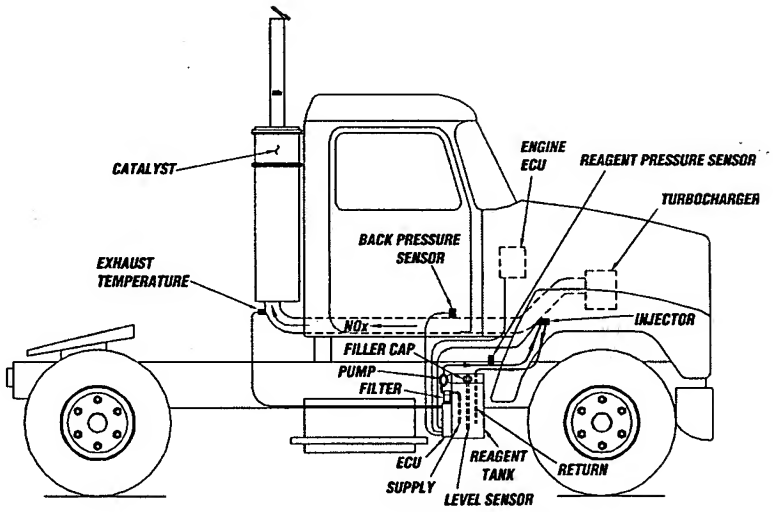
CCA also offers comprehensive engineering and hardware services to the power and transportation industries comprising:

- ENGINEERED COMBUSTION SYSTEM REPLACEMENT HARDWARE
- CFD MODELING
- EMISSION CONTROL SYSTEMS
- OVERFIRE AIR SYSTEMS
- FLUE GAS RECIRCULATION SYSTEMS
- OPTIMIZATION AND DIAGNOSTIC TESTING
- SCR FOR STATIONARY AND MOBILE APPLICATIONS

CCA COMBUSTION COMPONENTS ASSOCIATES 884 MAIN STREET MONROE, CT 06468 TEL (203) 268-3139 FAX (203) 261-7697
www.combustioncomponents.com

Combustion Components Associates, Inc.

Introduces
ELIM-NOx™
A Mobile Diesel NOx Emission Reduction System



Industry Leaders in Engineered Combustion Systems

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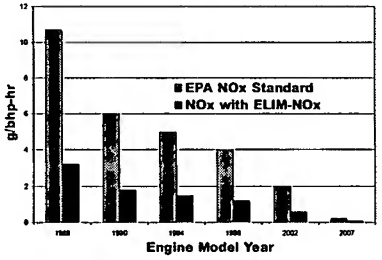
ELIM-NOx™ BEATS THE STANDARDS

Diesel engine NOx emissions are compared to a standard that allows engineers to compare emissions levels regardless of engine rated horsepower. Therefore, emissions are reported on a gram per brake-horsepower-hour (g/bhp-hr). Largely unregulated until 1988, diesel engine NOx emission standards change incrementally, with a major change ahead in 2007.

ELIM-NOx™ Potential Emissions Reductions



To lower emissions from engines designed to meet past and present emissions standards, CCA designed a cost effective solution using Selective Catalytic Reduction technology (SCR). SCR technology is considered to be a leading technology to help truck engines meet the stringent 2007 model year NOx emission standards. As a retrofit technology, CCA's technology can be applied to existing engines to drive emissions 70% below the standard. As with its engineered power plant products, CCA engineered ELIM-NOx™, a product to dramatically and economically reduce NOx.

ELIM-NOx™ USES A NON HAZARDOUS CHEMICAL

Urea Solid & Solution

ELIM-NOx™ meters precise amounts of a non-hazardous 32% by weight aqueous urea solution into the exhaust stream of the diesel engine. Once in the hot exhaust stream, the reagent decomposes to form ammonia and carbon dioxide. Ammonia mixes with the NOx and passes over an SCR exhaust gas catalyst to turn ozone-forming NOx into water and nitrogen.

$(NH_2)_2CO + H_2O \rightarrow CO_2 + 2NH_3$; Urea turns to carbon dioxide & ammonia

$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$; Nitric oxide turns to nitrogen and water

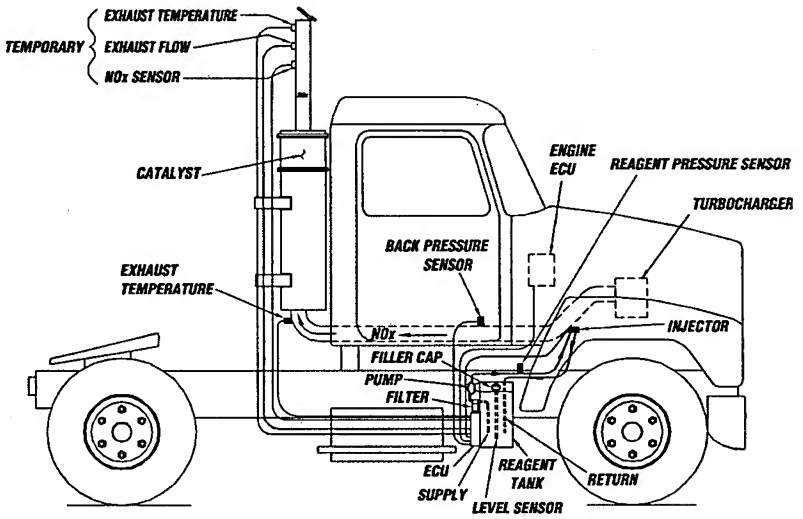
A clear solution, the reagent is made with urea prills dissolved in deionized water, it is non-toxic, and is widely available from a multitude of commercial suppliers. The 32% concentration keeps the freeze point of the urea solution at 14°F. The CCA system has a thermal protection option for vehicles operating below 14°F.

ELIM-NOx™ USES PATENTED TECHNOLOGY

CCA developed the ELIM-NOx™ system in conjunction with Clean Diesel Technologies, Inc (CDT) and utilizes the CDT patented ARIS™ single fluid return flow injection process. Compressed air is not required to atomize the reagent in the exhaust stream. ELIM-NOx™ is applicable to on-road and off-road diesel engines and dramatically reduces NOx emissions without the fuel economy penalty found with exhaust gas recirculation (EGR) equipped diesel engines. CCA also has applied for patents on a time saving retrofit strategy.

*ARIS is a registered trademark of Clean Diesel Technologies, Inc.

ELIM-NOx™ SELECTIVE CATALYTIC REDUCTION SYSTEM FOR MOBILE NOx EMISSIONS REDUCTIONS



ELIM-NOx™ COMPONENTS ARE:

- Tank module with pump, filter, fluid level sensor, reagent temperature sensor and electronic controller (J1922, J1587, and J1939 protocols).
- Injector and fluid lines
- Cab display panel (4"x6")
- Wiring harness
- Exhaust temperature, backpressure sensor,
- Catalyst, mixing section and exhaust pipe
- Temporary exhaust mass flow sensor, temperature sensor, and NOx sensor

Options include:

- Thermal protection (If ambient goes below 14°F for extended periods)
- 12 or 24 Volt power
- Engine injection timing sensor and crank angle position sensors
- Saddle tank, between frame tank, and behind cab tank (20 gallon capacity)

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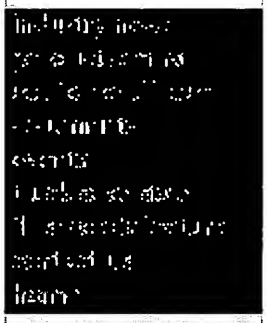
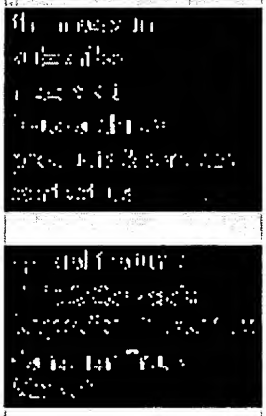
EXHIBIT B





Firm putting SCR trucks to work in U.S.

MONROE, Conn. (Aug. 16, 2004 – Combustion Components, a manufacturer of air pollution control technologies, announced that its ELIM-NOx SCR system will be incorporated on 6 diesel trucks in the New York and 12 off-road construction trucks in California.

The ELIM-NOx system works on the principals of SCR – Selective catalytic reduction. SCR is the choice for Europe's next round of emissions rules (called Euro 4) in October 2005, which are roughly equivalent to the 2007 North American standards. It's a well-developed technology that reduces NOx while returning better fuel consumption than EGR. It uses ammonia produced on board the vehicle from a non-toxic, easy-to-handle aqueous urea solution.

The company says a unique feature in the ELIM-NOx, is the proprietary "self-learn" monitoring system. This system uses sensors to measure NOx, exhaust temperature and record various engine parameters. It is temporarily mounted on the diesel truck for recording data as the vehicle operates in its normal driving conditions.

The orders, which exceed $400,000, represent the first large commercial contract for ELIM-NOx since it was commercialized for retrofit on existing on-road and off-road diesel applications and new trucks in early 2004, the company says.

CCA's technology is designed to achieve 90 per cent NOx reduction while overcoming any fuel economy penalties. Additionally, vehicles need not use ultra low sulfur diesel fuel oil, the company says.

The company hopes the technology will assist engine makers with complying with 2010 EPA regulations, which require a 90 per cent in NOx.

The downside of SCR is that it demands a supply network for the urea, with special pumps for filling the urea tank at truckstops and fleet yards.

Another reason every U.S. engine maker chose instead to expand on '02 EGR or ACERT technology for 2007, is because, to get to 2007 NOx levels, trucks would have to feed urea into the system at a rate of five per cent of fuel used. With urea

Sear truck S

Cu

UPS Car president
New Albe take effe
Firm putt in U.S.
Used truc there's st
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and diesel priced about the same, it would get expensive. The numbers work in Europe, where fuel is by far the more expensive of the two.

But some engine makers haven't ruled it out for 2010. Some engine makers such as Detroit Diesel and Volvo have extensive experience with the technology, and Cummins says it's already using it in some off-highway applications.

Volvo says it "will continue to participate in U.S. industry efforts to develop a national distribution infrastructure for urea." And Detroit Diesel calls it "a viable alternative for 2010."

Web Links:
Combustion Components
Environmental Protection Agency

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CCA Books Orders for 18 New SCR Systems on Diesel Trucks

SCR Units to Enable Diesel Trucks in New York and Southern California Meet Compliance Levels

MarketWire
Updated: 11:11 a.m. ET Aug. 12, 2004

MONROE, CT - E-Wire -- Combustion Components Associates (CCA), a company that develops, manufactures and markets air pollution control technologies, announced today the receipt of contracts for its ELIM-NOx SCR system on 6 diesel trucks in the New York Metropolitan Area and 12 off-road construction trucks in Southern California. The orders exceeding $400,000 represent the first large commercial contract for ELIM-NOx since it was commercialized for retrofit on existing on-road and off-road diesel applications and new trucks in early 2004. CCA's ELIM-NOx SCR technology is designed to achieve 90% NOx reduction while overcoming any fuel economy penalties. Additionally, vehicles need not use ultra low sulfur diesel fuel oil with this technology.

Making the announcement, R. Gifford Broderick, President, CCA said, "The new orders confirm the commercial viability of the ELIM-NOx system on both on-road and off-road diesel trucks as a low-cost, high-efficiency technology. Our low-NOx technology is designed to help bring diesel truck engines into compliance with new EPA regulations, which require a 50% to 90% reduction in NOx, phased-in between 2007 and 2010." With more than 600,000 new diesel trucks produced annually and 4 million existing trucks operating in various ozone non-attainment regions, the ELIM-NOx technology represents a huge low-cost incentive for diesel OEMs and fleet-owners for emission compliance.

The ELIM-NOx system works on the principle of Selective Catalytic Reduction using urea -- a safe and non-hazardous reagent. In addition to its cost-effectiveness, performance efficiencies, fuel economy and simplified controls, a unique feature of the technology is the proprietary 'self-learn' monitoring system. This 'self-learn' system uses sensors to measure NOx, exhaust temperature and record various engine parameters. It is temporarily mounted on the diesel truck for recording data as the vehicle operates in its normal driving conditions. The function is ideal for fleets that have identical vehicles, since the data from one vehicle can be utilized across the fleet resulting in high operating efficiencies.

Leveraging years of field expertise with power boilers and stationary engines, CCA has developed variants of its ELIM-NOx SCR technology control process with improved injector design and has filed two patents. These patent pending technologies are designed to extend product durability, improve urea utilization and facilitate greater NOx reductions from diesel trucks.

For the full text please click on the following link: http://www.ewire.com/display.cfm/Wire_ID/2257

Contact: R. Gifford Broderick President Combustion Components Associates 884 Main Street Monroe, CT 06468 203 268 3139 broderick@cca-inc.net http://www.cca-inc.net

URL: http://msnbc.msn.com/id/5684395/

EIN PUBLISHING

Alan L. Freed Associates
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TUESDAY, AUGUST 17, 2004

MOBILE EMISSIONS TODAY

A Daily News Summary Covering Emerging Clean Air Transportation Issues

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Regulatory Report

EPA Seeks Comment on Proposed Truck Stop Idling Rules

The Environmental Protection Agency (EPA) recently announced it is seeking public comment on the development of uniform national standards for truck stop electrification infrastructure that are expected to help eliminate long-duration truck idling.

According to EPA, the proposed codes and electrical standards have been developed in consultation with a "range of interested parties." The deadline to submit comments is October 9, with more information about the proposed standards available at http://www.epa.gov/smartway/newsandevents.htm.

In other news, EPA announced it has awarded $50,000 for an interagency study designed to focus on truck drivers' exposure to harmful air pollutants while idling at truck stops. The study will be conducted by the Department of Energy's Oak Ridge National Laboratory and the University of Tennessee.

Contact: Cynthia Bergman, EPA, phone 202-564-9828, e-mail bergman.cynthia@epa.gov.

(EIN STAFF: 8/13)

Industry Report

CCA Books Orders for 18 New SCR Systems on Diesel Trucks

Monroe, CT-based air pollution control technologies developer, manufacturer and marketer Combustion Components Associates (CCA) recently announced the receipt of contracts for its ELIM-N0x selective catalytic reduction (SCR) on six diesel trucks in the New York metropolitan area and 12 off-road construction trucks in Southern California.

According to CCA, the orders, which exceed $400,000, represent the first large commercial contract for ELIM-NOx since it was commercialized for retrofit on existing on-road and off-road diesel applications and new trucks earlier this year.

CCA noted that the ELIM-NOx SCR technology is designed to achieve 90-percent nitrogen oxide (NOx) reduction while overcoming any fuel economy penalties.

Contact: R. Gifford Broderick, CCA, phone 203-268-3139, e-mail

Editor's Notes

- *EIN is interested in your company's activities. Send press releases, article tips and conference announcements to EIN Editorial Staff, fax 703-683-3893, e-mail editor@eintoday.com.*

broderick@cca-inc.net.

(EIN STAFF: 8/12)

SWA Approved for S&P's Corporate Records

North Hollywood, CA-based emissions-reduction technology developer Save The World Air, Inc. (SWA) recently announced it has been approved for full inclusion in Standard & Poor's (S&P) Standard Corporation Records.

According to the company, S&P's Standard Corporation Records provide public companies' financial information and "are accepted as the recognized securities manual for 'Blue Sky/Manual Exemption' trading by as many as 37 states."

"Listing in the Corporate Records provides the investment community with both information on our company and a greater ability to trade the stock," said SWA chairman and CEO Ed Masry. "Our investors and brokers have been waiting a long time for this news."

Contact: Edward Masry, SWA, phone 818-487-8000.

(EIN STAFF: 8/12)

GRADING & EXCAVATION CONTRACTOR

News

CCA Books Orders for 18 new SCR systems on Diesel Trucks

SCR units to enable Diesel Trucks in New York and Southern California meet compliance levels

Combustion Components Associates (CCA), a company that develops, manufactures and markets air pollution control technologies announced today the receipt of contracts for its ELIM-NOx SCR system on 6 diesel trucks in the New York Metropolitan Area and 12 off-road construction trucks in Southern California. The orders exceeding $400,000 represent the first large commercial contract for ELIM-NOx since it was commercialized for retrofit on existing on-road and off-road diesel applications and new trucks in early 2004. CCA's ELIM-NOx SCR technology is designed to achieve 90% NOx reduction while overcoming any fuel economy penalties. Additionally, vehicles need not use ultra low sulfur diesel fuel oil with this technology.

Making the announcement, R. Gifford Broderick, President, CCA said "The new orders confirm the commercial viability of the ELIM-NOx system on both on-road and off-road diesel trucks as a low-cost, high-efficiency technology. Our low-NOx technology is designed to help bring diesel truck engines into compliance with new EPA regulations, which require a 50% to 90% reduction in NOx, phased-in between 2007 and 2010". With more than 600,000 new diesel trucks produced annually and 4 million existing trucks operating in various ozone non-attainment regions, the ELIM-NOx technology represents a huge low-cost incentive for diesel OEMs and fleet-owners for emission compliance.

The ELIM-NOx system works on the principle of Selective Catalytic Reduction using urea - a safe and

non-hazardous reagent. In addition to its cost-effectiveness, performance efficiencies, fuel economy and simplified controls, a unique feature of the technology is the proprietary 'self-learn' monitoring system. This 'self-learn' system uses sensors to measure NOx, exhaust temperature and record various engine parameters. It is temporarily mounted on the diesel truck for recording data as the vehicle operates in its normal driving conditions. The function is ideal for fleets that have identical vehicles, since the data from one vehicle can be utilized across the fleet resulting in high operating efficiencies.

Leveraging years of field expertise with power boilers and stationary engines, CCA has developed variants of its ELIM-NOx SCR technology control process with improved injector design and has filed two patents. These patent pending technologies are designed to extend product durability, improve urea utilization and facilitate greater NOx reductions from diesel trucks.

About CCA

Combustion Components Associates (CCA), develops, manufactures and markets air pollution control technologies. For over twenty years, CCA has been an industry leader in the design, development, testing and manufacture of high efficiency, low emission combustion systems for fossil fuel fired boilers. In 2002, CCA developed the ELIM-NOx SCR system in conjunction with Clean Diesel Technologies, Inc. (CDT), Stamford, Connecticut. The company serves all the major power companies, pollution control technology providers and diesel truck operators. CCA currently has over 300 staff years of combined combustion engineering expertise and a total of 45 full-time employees including 14 full-time engineers. The company is headquartered in Connecticut and has a manufacturing facility in Florida.

What's New

CCA receives orders for 18 mobile diesel SCR systems

August 14, 2004

Monroe, CT-based Combustion Components Associates (CCA) announced the receipt of contracts for its ELIM-NOx SCR system on 6 diesel trucks in the New York Metropolitan Area and 12 off-road construction trucks in Southern California. The orders, which exceed $400,000, represent the first large contract for the ELIM-NOx since it was commercialized as a diesel retrofit system earlier this. The ELIM-NOx SCR technology is designed to achieve 90% NOx reduction without fuel economy penalties, said CCA.

The ELIM-NOx system utilizes a Selective Catalytic Reduction catalyst using aqueous urea solution as the NOx reductant. The use of ultra low sulfur diesel fuel is not required with the ELIM-NOx system. The technology can be also used to help comply with EPA regulations for new diesel engines, which require a 50% to 90% NOx reduction phased-in between 2007 and 2010, said CCA.

To system includes an electronic control unit, which is programmed for a given application using data from a "self-learn" monitoring system. The "self-learn" system—which uses sensors to measure NOx, exhaust temperature, and other engine parameters—is temporarily mounted on the diesel truck for recording data as the vehicle operates in its normal driving conditions. This allows to determine a map of the urea injection criteria without vehicle dynamometer tests. Data collected from one vehicle can be utilized across a fleet of identical vehicles that operate under similar conditions.

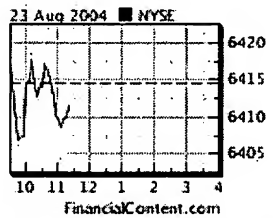
CCA has developed the ELIM-NOx system based on its experience in supplying SCR systems for stationary applications, such as power boilers and stationary engines. The urea injection system for mobile engines utilizes the ARIS system developed by Clean Diesel Technologies (CDT).

Source: CCA (press release)

Wall Street News Alert

Market Snapshot

NYSE NASD S&P 500



↓	NYSE	6409.97	-4.70
↑	NASD	1844.97	+6.95
↑	S&P 500	1099.09	+0.74

Stock Watchlist

↑	QQQ	34.114	
	+0.104	(+0.306%)	
↓	HLSH	5.350	
	-0.150	(-2.727%)	
↑	IBM	85.290	
	+0.040	(+0.047%)	

OTCBB Gainers

↑	EXGO	0.009	
	+0.00	(+100.00%)	
↑	BDLF	0.013	
	+0.01	(+73.33%)	
↑	VTYC	0.120	
	+0.04	(+60.00%)	

Recent News and Press Releases

CCA Books Orders for 18 New SCR Systems on Diesel Trucks

MONROE, CT – (MARKET WIRE) – 08/12/04 –

E-Wire – Combustion Components Associates (CCA), a company that develops, manufacti air pollution control technologies, announced today the receipt of contracts for its ELIM-NO: 6 diesel trucks in the New York Metropolitan Area and 12 off-road construction trucks in So The orders exceeding $400,000 represent the first large commercial contract for ELIM-NOx commercialized for retrofit on existing on-road and off-road diesel applications and new truc CCA's ELIM-NOx SCR technology is designed to achieve 90% NOx reduction while overco economy penalties. Additionally, vehicles need not use ultra low sulfur diesel fuel oil with th

Making the announcement, R. Gifford Broderick, President, CCA said, "The new orders cor commercial viability of the ELIM-NOx system on both on-road and off-road diesel trucks as efficiency technology. Our low-NOx technology is designed to help bring diesel truck engine with new EPA regulations, which require a 50% to 90% reduction in NOx, phased-in betwe 2010." With more than 600,000 new diesel trucks produced annually and 4 million existing various ozone non-attainment regions, the ELIM-NOx technology represents a huge low-co diesel OEMs and fleet-owners for emission compliance.

The ELIM-NOx system works on the principle of Selective Catalytic Reduction using urea – hazardous reagent. In addition to its cost-effectiveness, performance efficiencies, fuel econ simplified controls, a unique feature of the technology is the proprietary 'self-learn' monitori 'self-learn' system uses sensors to measure NOx, exhaust temperature and record various parameters. It is temporarily mounted on the diesel truck for recording data as the vehicle o normal driving conditions. The function is ideal for fleets that have identical vehicles, since vehicle can be utilized across the fleet resulting in high operating efficiencies.

Leveraging years of field expertise with power boilers and stationary engines, CCA has dev its ELIM-NOx SCR technology control process with improved injector design and has filed t patent pending technologies are designed to extend product durability, improve urea utiliza greater NOx reductions from diesel trucks.

For the full text please click on the following link: http://www.ewire.com/display.cfm/Wire_ID

Contact:
R. Gifford Broderick
President
Combustion Components Associates
884 Main Street Monroe, CT 06468

⇧	CSHEF	2.750
	+0.85	(+44.74%)
		More

NYSE Gainers

⇧	TGX	3.950
	+0.33	(+9.12%)
⇧	IOM	4.350
	+0.30	(+7.41%)
⇧	WTM	500.250
	+33.25	(+7.12%)
⇧	CY	11.020
	+0.62	(+5.96%)
		More

Nasdaq Gainers

⇧	BDSI	2.339
	+0.55	(+30.67%)
⇧	ESMC	8.070
	+1.48	(+22.46%)
⇧	IONA	4.390
	+0.61	(+16.14%)
⇧	ACBAW	2.830
	+0.38	(+15.51%)
		More

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203 268 3139
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http://www.cca-inc.net

News: Associations

CCA Gets Orders for 18 New SCR Systems

9/10/2004 — Combustion Components Associates (CCA), a Connecticut-based company that manufactures air pollution cor technologies, has received contracts for 18 of its ELIM-NOx SCR systems.

The orders include six diesel trucks in the New York metropolitan area and 12 off-road construction trucks in Southern Calif

The orders, which exceed $400,000, represent the first large commercial contract for ELIM-NOx since it was commercialize retrofit on existing on-road and off-road diesel applications and new trucks earlier this year.

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With more than 600,000 new diesel trucks produced annually and 4 million existing trucks operating in various ozone non-a regions, the company says ELIM-NOx technology represents a huge low-cost incentive for diesel OEMs and fleet-owners for compliance.

The ELIM-NOx system works on the principle of Selective Catalytic Reduction using urea – a safe and non-hazardous reac addition to its cost-effectiveness, performance efficiencies, fuel economy and simplified controls, a unique feature of the tech the proprietary "self-learn" monitoring system. This self-learn system uses sensors to measure NOx, exhaust temperature an various engine parameters. It is temporarily mounted on the diesel truck for recording data as the vehicle operates in its norm conditions. The function is ideal for fleets that have identical vehicles, since the data from one vehicle can be utilized across t resulting in high operating efficiencies.

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PRESS RELEASES

URL To Story: http://press.arrivenet.com/aut/article.php/420571.html

CCA Books Orders for 18 New SCR Systems on Diesel Trucks

SCR Units to Enable Diesel Trucks in New York and Southern California Meet Compliance Level

Distribution Source : Market Wire
Date : Thursday - August 12, 2004

E-Wire – Combustion Components Associates (CCA), a company that develops, manufactures and markets air pollution contr technologies, announced today the receipt of contracts for its ELIM-NOx SCR system on 6 diesel trucks in the New York Metropolitan Area and 12 off-road construction trucks in Southern California. The orders exceeding $400,000 represent the firs large commercial contract for ELIM-NOx since it was commercialized for retrofit on existing on-road and off-road diesel applica and new trucks in early 2004. CCA's ELIM-NOx SCR technology is designed to achieve 90% NOx reduction while overcoming fuel economy penalties. Additionally, vehicles need not use ultra low sulfur diesel fuel oil with this technology.

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For the full text please click on the following link: http://www.ewire.com/display.cfm/Wire_ID/2257

Contact:
R. Gifford Broderick
President
Combustion Components Associates
884 Main Street Monroe, CT 06468
203 268 3139
broderick@cca-inc.net
http://www.cca-inc.net

EXHIBIT C

(Article referred to in paragraph 18 of Tarabulski Declaration, reference to which was inadvertently omitted in the Declaration)

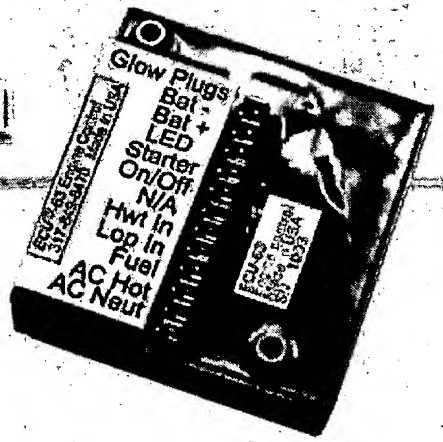
NORTH AMERICAN EDITION

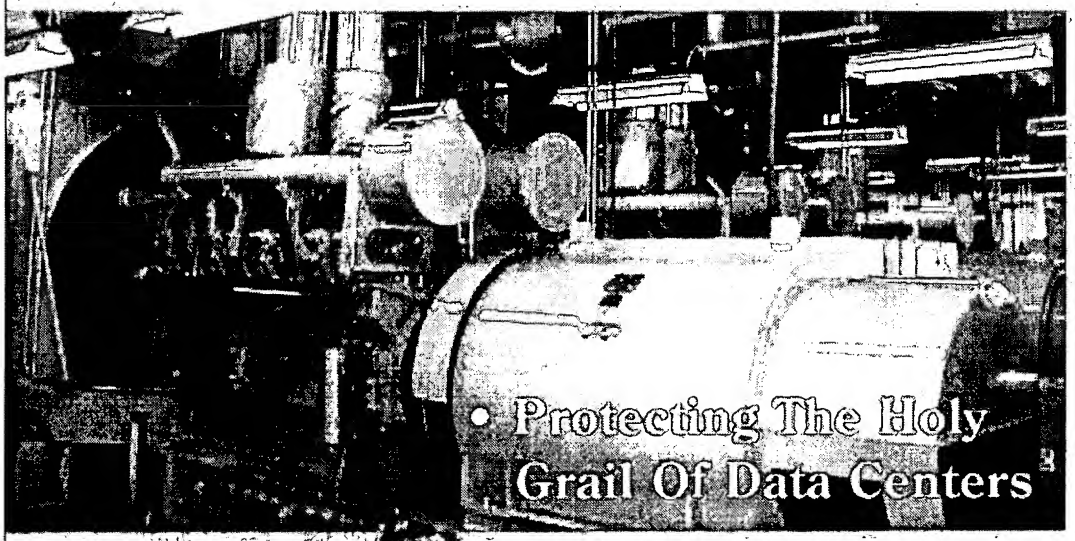
November 2004

DIESEL PROGRESS

Products, Technology & Industry News For All The Engine-Powered Equipment And Component Markets

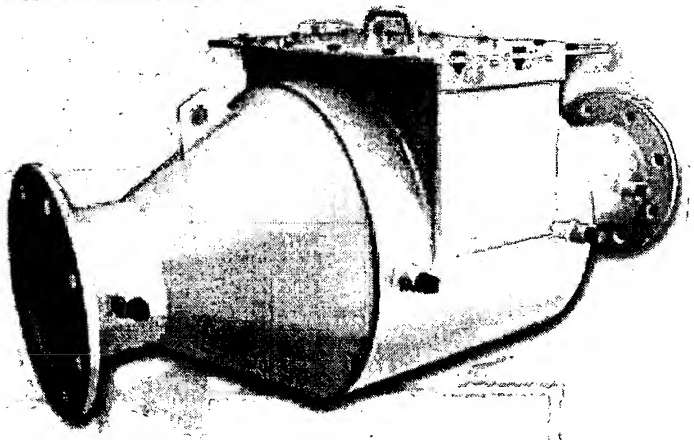
Power Generation Sets & Systems





- Protecting The Holy Grail Of Data Centers

- New Gen-Set Controls
- Backup Without Batteries?



- New Silencer Technology

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The Economics Of Emissions For Heavy-Duty Trucks

By Ravi Krishnan
And T.J. Tarabulski

Emissions from diesel engines are a significant air-quality issue, accounting for about one-third of the nation's NO_x emissions and one-quarter of the PM emissions from mobile sources. The U.S. EPA has responded with new, tougher emissions standards, the first tier of which took effect in 2004 (October of 2002 for engine builders affected by the consent decree). Even more stringent rules will take effect in 2007 and 2010, along with new diesel fuel standards requiring lower sulfur levels.

With these changes, a review of technology options available to OEMs, fleet owners and operators is in order.

First, let's take a brief look at the standards themselves. The EPA's standards introduce a lower NO_x limit of 0.2 g/bhp-hr that must be fully phased in by 2010. Between 2007 and 2009 at least 50% of this NO_x emissions limit must be achieved. Manufacturers can satisfy this requirement by bubbling the emissions and certifying that the NO_x limit for all their 2007-2009 model engines is approximately 1.1 g/bhp-hr. In other words, the phase-in will be on a percent-of-sales basis, i.e., a 50% reduction from 2007 to 2009 and 100% by 2010.

EPA Standards — Table 1

2004 EPA Heavy-Duty Engine Standards	EPA Recommended Strategies for Meeting Standards
• 2.5 g/bhp-hr combined HC + NO_x • 0.10 g/bhp-hr PM & 0.05 for urban buses	— Cool Exhaust Gas Recirculation — Oxidation Catalysts — Injector Timing
2007-10 EPA Heavy-Duty Engine Standards	**EPA Recommended Strategies for Meeting Standards**
• 0.20 g/bhp-hr NO_x • 0.14 g/bhp-hr HC • 0.14 g/bhp-hr PM fully implemented in 2007	— Particulate Filters — NO_x Adsorbers — Selective Catalytic Reduction

The EPA heavy-duty on-highway emissions standards and the agency's recommendations on the technology that can be applied to meet them.

The EPA has also introduced a new emission standard of 0.01 g/bhp-hr for PM (down from the current 0.1 g/bhp-hr) that must be met by 2007. These standards thus include flexibility provisions to facilitate the transition to the new standards, and encourage early introduction of clean technologies for both new and existing sources.

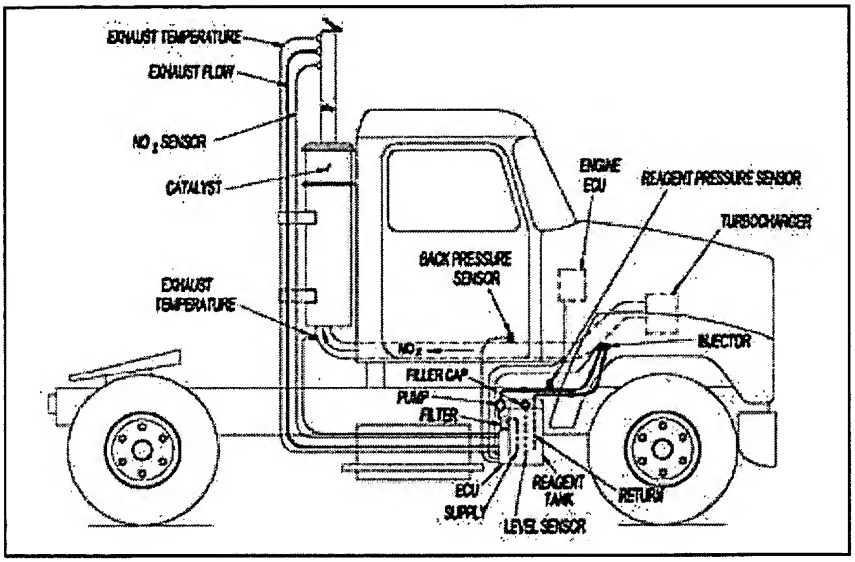
Major manufacturers such as Caterpillar, Cummins, Detroit Diesel and International Truck and Engine have adopted diesel particulate filters as the preferred strategy/technology for PM reduction, but there is no consensus on NO_x control technologies. The two most practical and cost-effective approaches to lower NO_x emissions from diesel trucks are in-cylinder techniques such as a high rate of EGR and exhaust system technologies such as urea-SCR, which is being adopted in the European Union starting in 2005 (Euro 4).

These new standards will also indirectly affect existing diesel trucks and fleet operators in several non-attainment regions of the nation. There are approximately 11.3 million diesel trucks operating in the United States, and an estimated four million trucks operate in various non-attainment areas. Such fleet owners will be subject to a voluntary retrofit program accompanied by financial incentives to encourage compliance.

By June 1, 2006, fuel refiners will be required to start producing diesel fuel for use in on-highway vehicles with sulfur levels no more than 15 parts per million (ppm). The program offers some flexibility to refiners such as an averaging, banking and trading component, beginning in June 2006 and lasting through 2009, with credit given for early compliance before June 2006.

Several options are available to manufacturers and fleet owners who are considering improving the emissions performance of their diesel engines. These include converting engines to alternative fuels like compressed natural gas and retrofitting older engines with modern emission control technologies.

Ravi Krishnan is principal and managing director of Krishnan & Associates Inc., a Norwalk, Conn.-based provider of sales & marketing, market analysis and strategic investment planning services for the power industry, with a focus on energy and environmental industries. Telephone: (203) 854-6700; e-mail ravi@krishnaninc.com. T.J. Tarabulski is product manager, Combustion Components Associates (CCA), global provider of air-pollution control technologies for boilers, stationary and mobile IC engines. Telephone: (203) 268-3139; e-mail tarabulski@cca-inc.net.



The basic layout of a CCA urea SCR system applied in a heavy-duty truck.

Retiring older engines and converting to natural gas can be very expensive to a diesel truck operator, especially given the current high price of natural gas. Hence, engine retrofits such as EGR and exhaust control technologies emerge as the most practical option for cost-effective emission compliance for new and existing trucks.

An accompanying table provides a comparative analysis of emission reduction technologies to meet the new on-road diesel vehicle emission standards. Most manufacturers and fleet owners expect to implement one or some combination of these technologies. The NO_x and PM control devices cited are at various levels of development and commercialization. Some devices are verified by the EPA and/or the California Air Resources Board (CARB) to achieve the expected levels of NO_x and PM efficiency.

Many methods of engine-based emission control have been investigated since the advent of emission standards for diesel engines. These methods range from minor hardware improvements to a redesign of major engine components such as the combustion chamber, to introduction of electronic control of the fuel delivery system. Another common engine-based technique for low-cost compliance is exhaust gas recirculation (EGR). While cooling of the exhaust gases and advanced fuel injection systems used in an EGR provides some benefits such as higher injection pressures and flexible fuel injection timing, concerns exist about condensation, packaging and engine integration constraints such as the fuel and air management system upgrades needed to counteract increased PM from EGR.

Moreover, there are questions as to whether these and other engine design improvements can comply with the 2007 and 2010 standards. It seems unlikely that the earlier standard can be met through EGR-based approaches alone and there is unanimous agreement that aftertreatment or exhaust control treatment such as SCR and NO_x adsorbers will be required to meet the 2010 numbers.

While SCR's ability to achieve high levels of reduction is well documented, NO_x adsorber technology is not capable of achieving the 90% reduction level at the present time. NO_x adsorbers require engine integration and a means for supplemental fuel injection. NO_x adsorbers reduce nitrogen oxides in two steps. First, the catalyst chemically traps and stores the nitrogen oxides. Eventually the catalyst's active sites "fill up," setting off the second step-regeneration, in which diesel fuel or other hydrocarbons are injected directly into the exhaust gas. This artificial hydrocarbon-rich (reducing) environment triggers the release of

Comparative Analysis of Emission Reduction Technologies — Table 2

Emission Control Device	Description	Expected NO_x Efficiency	Expected PM Efficiency	Status
Emission Control Device	Recycles the exhaust gas back to the engine intake system.	50%-60%	N/A	In commercial use; still concerns about condensation, packaging and engine integration constraints such as fuel and air management system upgrades.
NO_x Adsorber	Adsorbs NO and oxygen during lean operation uses CO and HC from periodic rich operation to convert to N_2	>80%	30%	In development; available in 2007.
Oxidation Catalyst	Oxidizes HC and CO in catalyst.	None	80%-90%	Verified for some heavy-duty engines model year and duty cycles in CA.
SCR	Converts NO_x to N_2 and O_2 in the presence of urea.	70%-90%	20%-30%	In commercial use in bus engines; not verified for non-bus heavy-duty engines.
Non-thermal Plasma	High energy electrons convert exhaust pollutants to inert species.	>80%	30%	In development/ demonstration. Available 2005-2007. Requires reductant, dispensing and storage infrastructure.
Diesel Particulate Filter	Collects particles in diesel exhaust.	>65%	30%	In demonstration phase for light-duty; in development for heavy-duty applications.

A look at various emissions control technologies.

oxygen and the conversion of nitrogen oxides to nitrogen and water.

On the downside, regeneration exacts a penalty in fuel economy, projected at over 5% as a result of the injection of fuel into the exhaust gas. Adsorbers are also quickly poisoned by sulfur, and their efficiency drops substantially even when exposed to very low levels. Although this can be reversed through desulfurization, it can be expensive and uneconomical depending on sulfur levels in the fuel.

Urea SCR is a technology where a NO_x reducing agent — an aqueous solution of urea — is injected into the exhaust gas upstream of the SCR catalyst. The urea solution must be carried on-board in a tank.

Compared to other technologies, the use of urea-SCR could potentially provide better fuel economy and lower operating costs. These systems have been shown to reduce NO_x by 65 to 99% over a range of diesel operating conditions. SCR technology has been employed on stationary sources for over 15 years. However, mobile SCR technology must achieve smaller packaging, be durable and function effectively in a diverse range of a truck engines. Moreover, systems must be designed to prevent ammonia slip in which unreacted ammonia escapes out the tailpipe.

Recent developments in SCR technology such as the ELIM-NO_x system designed and developed by Monroe, Conn.-based Combustion Component Associates (CCA) has addressed this problem by tailoring the amount of urea injected into the catalyst as a function of engine control parameters such as RPM and load while providing on-board diagnostics for the various functions.

A recent survey conducted by Manufacturers of Emission Control Association (MECA) shows that the cost for an SCR system for engines in the 300 hp to 500 hp range can vary from $11,000 to $50,000 per system depending on the volume of the order. As the market for diesel exhaust emission control technology for new and retrofit applications grows, it is anticipated that the costs of the SCR system will continue to drop over time. Moreover, the cost for the manufacturer or the diesel truck operator depends on the volume of SCR systems ordered and the amount of NO_x removal desired. The unit cost of a single system will be significantly higher than a volume order of 500 systems.

An accompanying table analyzes the annual compliance cost of an SCR system over a five-year life on engines with a variable NO_x emission rating based on the engine model year. Assuming a NO_x reduction requirement of 70%, the cost per ton of NO_x removed for the SCR system analyzed ranges from $1400 to $2600 per ton depending on the NO_x emission rating of the truck. Greater emission reduction is possible on an older truck; consequently, the fixed system cost is allocated among more tons resulting in a lower cost per ton.

To help achieve air quality goals and encourage diesel truck manufacturers and owners to comply, EPA through its Voluntary Diesel Retrofit Program is developing policy options for using emissions credits generated by retrofitting diesel engines as credits to be traded and as stationary source offsets. New trucks that install emission controls prior to 2007 can be eligible for Early Compliance Credits. Some other incentive programs in development are averaging, banking and trading (ABT), emissions trading, market-based allowance trading, mobile source emission reduction credits (MERCs) and open market emissions trading.

While engine manufacturers and OEMs can apply early compliance credits to other non-compliant diesel engines, operators of existing diesel trucks who voluntarily reduce emissions can be eligible to a State Implementation Plan (SIP) credit, an economic incentive to recover the costs of the pollution control device within the NO_x SIP region.

Most of the economic incentives for diesel truck operators are likely to be centered in the ozone non-attainment regions. These regions are most likely to make voluntary compliance as economically attractive for fleet owners as possible, given the severe ozone non-attainment levels in the region. A lowering of NO_x emissions levels from diesel trucks in these severe non-attainment regions will contribute significantly to the reduction of acid-rain, ground level ozone and reduced visibility. ★

Engine Model Year	2002	1998	1991	1988	Units
NO_x Reduction	70%	70%	70%	70%	Percent Reduction
Annual Miles	125,000	125,000	125,000	125,000	Miles
Average Speed	50	50	50	50	mph
Rated hp	350	350	350	350	hp
Engine Load Factor	70	70	70	70	Load Factor
NO_x Eliminated	1.2	1.9	2.4	3.8	Tons/Yr/Truck
Annual Cost	$3,120	$3,980	$4,320	$5,360	Capital & Operating Cost/Yr
5-Year Cost	$15,600	$19,900	$21,600	$26,800	Estimated Life Cycle Cost
Tons Eliminated (5 Years)	6	9.5	12	19	Tons for 5 Years
Cost Per Ton	$2,600	$2,095	$1,800	$1,411	Cost/Ton of NO_x Removed

An analysis of the cost-per-ton breakdown of various emissions technologies.

PREPRINTED FROM NOVEMBER 2004 DIESEL PROGRESS North American Edition